

REMARKS

In the present Office Action, claims 1-20 were examined. Claims 11-20 were subject to restriction or election. Claims 1-5 and 7-10 were rejected, claim 6 is objected to, and no claims were allowed.

By this Amendment, claims 7, 11 and 17 have been amended, claims 2, 3, 4, 5, 8 and 12 have been canceled, and no claims have been added. Accordingly, claims 1, 6-11 and 13-20 are presented for further examination. No new matter has been added. By this Amendment, claims 1, 6-11 and 13-20 are believed to be in condition for allowance.

Applicants appreciate the fact that the Examiner has indicated that claims 5 and 6 would be allowable if rewritten in independent form. It should follow that current claims 8-10 are also allowable for the same reasons because they include the same limitations as claims 5 and 6. Furthermore, corresponding processing claims 15, 16 and 18-20 would thus be allowable under the Doctrine set forth in O.G. Notice dated February 28, 1996 entitled "Guidance on Treatment of Product and Process Claims in light of *In re Ochiai*, *In re Brouwer* and 35 U.S.C. §103(b)".

The undersigned attorney wishes to thank Examiner Hamilton for the courtesy of a telephonic interview on Thursday, October 2003.

In the interview, the Examiner agreed that pending composition claims 1 and 6-10 were allowable the inclusion of the specific solvents and correction of the informalities. She reserved any decision on the pending process claims 11 and 13-20.

Explanation of Above Amendments

While claim 5 has been cancelled, the correct solvent name "gamma-butyrolactone" is now present in claims 1, 7, 9, 11 and 17.

Claims 7 and 17 have been amended to more correctly identify component (a) as an --epoxidized polyfunctional bisphenol A formaldehyde novalak resin-- rather than simply "an epoxy resin". Basis for this amended language can be found on page 6 of the present specification. Claims 7 and 17 have been amended further to include the casting solvents of claims 5 and 8.

No new matter is intended or believed to be included in any of these amendments.

Rejections/Objections under 35 USC §112

The Examiner rejected claims 7-10 under 35 U.S.C. §112, first paragraph. Applicant respectfully traverses this rejection in view of the above amendments to claim 7. The language requested by the Examiner has been inserted. Note corresponding process claim 17 has also likewise been amended.

The Examiner rejected claim 5 under 35 U.S.C. §112, second paragraph. Applicant respectfully traverses this rejection in view of the above amendment.

Rejections under 35 USC §103

The Examiner rejected claims 1-4 and 7 as being obvious and unpatentable over Janke (U.S. Patent No. 5,726,216), taken in view of Applicant's Disclosure of well known prior art on page 2 of the Specification as well as Schrader (U.S. Patent No. 4,474,929) and Gelorme et al. (U.S. Patent No. 4,882,245). In making this rejection, the Examiner stated the following:

“Janke et al teaches the instant composition with the exception of specifically combining the listed epoxidized polyfunctional bisphenol A formaldehyde novolak resin more specifically SU-8, with the polyol more specifically Tone 0301, 0305 or 0310 polycaprolactone polyol reactive diluent and with the triaryl sulfonium hexafluoroantimonate salt Cyracure UV I-6974. However, Janke et al does teach as do applicants that radiation cured epoxy resins incorporating cationic photoinitiators tend to be very brittle. Schrader supports this point with respect to SU-8 in particular in his col. 1 disclosure so supports Janke et al specifically in regard to SU-8 resins. Gelorme et al in their examples also report the brittle nature of SU-8 photoresists. Gelorme addresses the problem by using other epoxies as reactive diluents to reduce the brittle nature of the SU-8 resin. In Gelorme, see particularly column 4 and examples. Janke et al are concerned with a broad group of epoxy resins including the same SU-8 epoxidized polyfunctional bisphenol A formaldehyde novolak resin which is applicant's sole concern. Janke et al's solution is broader than that of applicants in that they believe what was needed was a means by which radiation cured cationic epoxies can be toughened and still retain the good thermal and mechanical properties of the original composition. They do that by teaching the incorporation of toughening with the epoxy resin initiator mixture. These toughening agents include thermoplastics, hydroxy-containing thermoplastic oligomers, epoxy-containing thermoplastic oligomers, reactive flexibilizers, elastomers, rubbers, and mixtures thereof. An additional advantage Janke et al teach is obtained by the use of low viscosity reaction flexibilizers to reduce the overall viscosity of the uncured

resin mixture. Incorporation of one or more of these toughening agents has resulted in increases in toughness of more than 230% over that of the untoughened epoxy resin according to Janke et al. Thus, with respect to instant claims 1-4, the use of any of the epoxy resins of Janke et al listed inclusive of epoxidized polyfunctional bisphenol A formaldehyde novolak resin with known photoinhibitors as listed such as the triaryl sulfonium hexafluoroantimonate salt Cyacure UV I-6974 mixed with any of the flexibilizers of Janke et al found compatible would have been prima facie obvious to obtain a less brittle cured epoxy composition. The modifying of the epoxy resin with various polyol additives such as ethylene glycol as reactive diluent is also taught separate from adding the flexibilizer. Gelorme et al in col. 4 of his disclosure does not limit his reactive diluents to epoxies. In lines 25-33, is stated 'other suitable reactive diluents will readily come to mind to those ordinary skill in resin technologies.' In Janke et al, see particularly the Abstract, col. 1, lines 15-21, col. 2, lines 35-55, col. 3, lines 40 to col. 4, lines 47, col. 5, lines 32-33, col. 6, lines 46-col. 7, lines 28, col. 8, lines, lines 1-30, lines 62 to col. 9, lines 20 and lines 56-61, col. 10, lines 11-24, col. 14, lines 3-59. Thus, the prior art teaches adding the capropactones to epoxy resins for the same reason applicants add them to their epoxy resin compositions. The ranges of percentage of the toughener of Janke et al to epoxy resin is found in Tables 1-3 to be from 5 to 30 weight %. Thus, workers of ordinary skill in the epoxy art world would recognize that the SU-8 resins would be mixed with a flexibilizer in the same general amount to obtain a tougher cured coating as set forth by Janke et al. Applicants on page 2 of their specification make clear all but the use of the polyol with respect to the thick film resists SU-8 is known. The addition of a flexibilizer as taught by Janke et al to reduce the known brittle nature of the epoxy would have been prima facie obvious as well. The examiner does note however that Janke et al alone makes the instant composition of claim 1-4 obvious over the prior art in her opinion."

Applicant's arguments filed May 22, 2003 have been fully considered but they are not persuasive. Applicants argue Janke et al. does not teach adding a separate solvent to dissolve the above-noted three ingredients or any specific suggestions for combining the four presently claimed components. The examiner disagrees and as rewritten the rejection to emphasize Janke et al. teachings to the addition of non reactive diluent such as acetone being added to solvent based systems such as prepeg compositions. Thus, Janke et al. does teach the use of a solvent in their compositions when needed for the end use. Thus, a four component system is taught. Applicants argue that the examiner has not pointed out why it is obvious "to select the specific

claimed polyfunctional bisphenol A formaldehyde novolak resin along with the specific claimed caprolactone polyol reactive diluent out of the great multitude of possible combinations of compounds mentioned in Janke et al” and that the examiner “never provides any reason why it would be obvious to select these particular classes of compounds and then combine them.” They then state “Janke et al. or the other references certainly offers no reason to do so. It thus appears that the Examiner is attempting improper hindsight or obvious-to-try reasoning by this rejection”. In response to applicant’s argument that the examiner’s conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant’s disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In response to applicant’s argument that the examiner “never provides any reason why it would be obvious to select these particular classes of compounds and then combine them”, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Janke et al. gives the reason to combine every listed example of epoxy resin with every listed example of flexibilizer in his disclosure and that reason is to provide a radiation cured material with improved toughness, i.e. they are very brittle when cured. The examiner presented facts supporting this finding and applicants agreed with it. Janke et al. addresses this problem generally with the addition of their flexibilizers, i.e. component (C). This is the same problem addressed by applicants when they seek to reduce the brittle nature of their cured SU-8 coatings. Thus, the citation of specific species by Janke et al. is held sufficient for their choice to be improved by the flexibilizers given. Janke et al. teaches the reason it is obvious to try their flexibilizers and the prior art teaches that the specific epoxy resin in question has the problem solved by Janke et al. Thus, the rejection is maintained.”

Applicants respectfully traverse this Final rejection for the following reasons:

Janke et al is concerned with making toughened epoxy resin/cationic initiator system comprising an epoxy resin; a cationic initiator and a toughening agent (see column 3, lines 1 and 2). The latter ingredient may be either a thermoplastic, hydroxy-containing thermoplastic oligomer, epoxy-containing thermoplastic oligomer, reactive flexibilizer, rubber, elastomer or mixtures thereof (see column 3, lines 5 to 8)., One of the epoxy resin SU-8 available from Shell (see column 5, lines 32 and 33).

The reference also states that the epoxy resin monomer may be modified by mixing with various additives. See column 6, line 46 to column 7, lists reactive diluents. Included in this long list of such additives are polyols such as glycols, aromatic diphenols and polyphenolic compounds. See column 6, lines 48 to 66.

The cationic initiator includes CYRACURE Cationic Photoinitiator UV1-6974 (see column 8, lines 27 to 29). One of the toughening agents mentioned include flexible polyol compounds also containing long aliphatic groups such as E-caprolactone triol (such as Union Carbide TONE 0301, 0305, 0310) (see column 9, lines 56 to 61).

It should be noted that Janke et al. does not teach adding a separate solvent to dissolve the above-noted three ingredients or any specific suggestion for combining the four (4) presently claimed components.

In all, Janke et al. recites a vast array of possible combinations of epoxy monomers, cationic photoinitiators and toughening agents, but provides no motivation for making the particular selection of components as presently selected. Furthermore, Janke et al. or the present combination of cited references do not teach or suggest two important advantages of the present invention, namely, the better solvent-induced cracking and the adhesive characteristics. Furthermore, Janke does not teach or suggest the specific casting solvents now present in all claims.

Schrader is concerned with preparing certain epoxidized novalacs that have a more closely knit structure than the SU-8 epoxy resin (see column 2, lines 56 to 59). It appears the only specific end uses of these particular epoxidized novalacs are mentioned in short passage at column 18, lines 10 to 25. This passage does not teach the preparation of photoimaging compositions for use as negative photoresists or the mixing of such epoxidized novalacs with either a reactive polyol diluent, a cationic photoinhibitor or a casting solvent, let alone a combination of the four specific ingredients now claimed. In

all, it appears the Examiner is using Schrader to confirm that SU-8 is brittle or hard when cured (see column 1, line 45 and lines 65-68). Applicants do not take issue with that fact.

Gelorme, et al. is concerned with making a photoresist composition that contains (a) an epoxyfunctional resin which is capable of being cured by the action of a cation-producing photoinitiator; (b) a reactive diluent which is soluble in developing solvents for photoresists; and (c) a cationic photoinhibitor, . . . wherein (a) comprises at least about 65% by weight of the resin solids and is dissolved in a suitable solvent; (b) comprises 10 to about 35% by weight of the resin solids; and (c) is present in an amount from about 2 to about 6 parts per 100 parts of resin and is dissolved in a suitable solvent (see column 2, lines (6 to 40). The epoxyfunctional resin can be SU-8 (see column 4, lines 5 to 7). The reactive diluent can be any reactive diluent which is effective as a plasticizer. The only specific classes of reactive diluents mentioned are cycloaliphatic epoxides (see column 4, lines 25 to 40). The photoinitiator may be a triarylsulphonium hexafluoroantimonate (see column 4, lines 62 to 67). Suitable solvents include methyl isobutyrolactone, methyl ethyl lactone and mixtures thereof. It is clear that Gelorme, et al. does not teach any polyol reactive diluents, let alone polycaprolactone polyol reactive diluent.

In all, the present claims are now limited to the allowable subject matter of claim 5.


Accordingly, Applicant submits that none of the references, alone or in combination, anticipate or make obvious the invention as presently claimed and that the application is now in condition for allowance. Therefore, Applicant respectfully requests reconsideration and further examination of the application and the Examiner is respectfully requested to take such proper actions so that a patent will issue herefrom as soon as possible.

If the Examiner has any questions or believes that a discussion with Applicant's attorney would expedite prosecution, the Examiner is invited and encouraged to contact the undersigned at the telephone number below.

Please apply any credits or charge any deficiencies to our Deposit Account No. 23-1665.

Respectfully submitted,
David W. Minsek et al.

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Reg. No. 27,096



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